INFORMATION SHEET

ORDER NO.
CALPINE SISKIYOU GEOTHERMAL PARTNERS, L.P., AND
CPN TELEPHONE FLAT, INC., AND
U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE AND
U.S. DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT
GLASS MOUNTAIN UNIT GEOTHERMAL EXPLORATION AND DEVELOPMENT PROJECTS
SISKIYOU COUNTY

GLOSSARY OF TERMS

The following is a glossary of terms used in this Order, which are specific to geothermal well drilling and regulation of geothermal exploration:

Circulation Loss The loss of drilling fluid to a formation, usually caused when the hydrostatic head pressure of the column of drilling fluid exceeds the formation pressure. This loss of fluid may be loosely classified as seepage losses, partial losses or catastrophic losses, each of which is handled differently depending on the risk to the rig and personnel, the economics of the drilling fluid and the environmental implications. An example of a catastrophic loss would be break through to a lava tube, which could potentially allow pollutants to enter aquifers containing potable water.

Enhanced Geothermal Systems See Formation Stimulation

Formation Stimulation Formation stimulation is a general term which includes a number of techniques used to increase the production of a well. However in this Order, formation stimulation refers only to the injection of hydrochloric and/or hydrofluoric acids into a well's production formation. Small quantities of other materials, such as corrosion inhibitors, could also be added. The quantity of acid used would vary from well to well and could range from 1,000 to 60,000 gallons per well. Under favorable conditions, the chemical action of the acids on the adjacent strata opens up the formation, thereby increasing the production rate of geothermal fluids. More specifically, the acid dissolves the calcium carbonate and silica-based minerals which may have been deposited or precipitated in the natural geothermal reservoir fractures, and which reduce or prevent the flow of geothermal fluid from the reservoir through fractures into the well bore. Clearly, the effectiveness of formation stimulation is dependent on the composition and physical properties of the adjacent strata. After allowing the acid sufficient time to dissolve the precipitated minerals in the geothermal reservoir, the spent acid is flowed back to the surface, discharged to the well site geothermal fluids sump, and immediately injected back into the geothermal reservoir. To insure re-injection remains uninterrupted, the Discharger will maintain two re-injection pumps, one primary and one spare, at each geothermal fluid sump being used for formation stimulation. Spare pumps will be tested on a regular basis to insure they remain in operating condition. A spill plan for the materials to be used in the stimulation has been prepared as required by U.S. Department of Interior, Bureau of Land Management (BLM).

Terms used synonymously with formation stimulation in this Order are "well work over" and "enhanced geothermal systems" (EGS). In a wider context, EGS is defined by the US Department

of Energy (DOE) as, "engineered reservoirs created to produce energy from geothermal resources deficient in economical amounts of water and/or permeability." The term "work over" is defined in the Schlumberger oilfield glossary as "the repair or stimulation of an existing production well for the purpose of restoring, prolonging or enhancing production."

Geothermal Unit Lease Area Holders of federal geothermal leases and their representatives who wish to unite with each other, or jointly or separately with others, in collectively adopting and operating under a cooperative or unit plan for the development of any geothermal resources pool, field or like area, or any part thereof, may enter into a unit agreement. A geothermal unit lease area is the area described in a unit agreement as constituting the land logically subject to development under such agreement.

Known Geothermal Resource Area (KGRA) KGRA is defined in 43 Code of Federal Regulations (CFR) Part 3200 as "an area where BLM determines that persons knowledgeable in geothermal development would spend money to develop geothermal resources." They are: (1) areas of obvious geothermal activity such as hot springs designated by the US Geological Survey (USGS); and (2) areas where applications to lease overlap to such a degree as to indicate strong geothermal potential. The Geothermal Steam Act of 1970 (Act), as amended, (84 Stat, 1566; 30 U.S.C. 1001-1025) provides the Secretary of the Interior with the authority to lease public lands and other federal lands, including National Forest lands, for geothermal exploration and development in an environmentally sound manner. This authority has been delegated to the BLM. BLM implements the Act through the regulations contained in 43 CFR Part 3200. Geothermal leases are issued through competitive bidding for federal lands within a KGRA, or noncompetitively for federal lands outside of a KGRA. There are 18 KGRAs in California.

Plan of Operations (POO) A POO is a plan which fully describes the location of proposed drill pads, access roads and other facilities related to the drilling and testing of federal geothermal resources, and includes measures for environmental and other resources protection and mitigation.

Shield Volcano A volcano with broad, gentle slopes built by the eruption of fluid basalt lava.

Stipulation A stipulation means additional conditions BLM attaches to a lease or permit.

Sundry Notice A sundry notice is a written request to perform work not covered by another type of permit, or to change operations in a previously approved permit.

Temperature Gradient Hole A temperature gradient hole is a small diameter cased "well" drilled for the sole purpose of determining the temperature gradient profile below the ground surface. The temperature gradient is the natural increase of temperature with depth in the earth. Temperature gradients vary widely over the earth, sometimes increasing dramatically around volcanic areas. Determining the temperature gradient profile over an area suspected of having potential as a source of geothermal energy is a means of determining the most attractive drill sites

for exploration and production wells. The term "temperature core hole" is used synonymously with temperature gradient hole.

Unit Agreement Unit agreement means an agreement to explore for, produce and utilize separately owned interests in geothermal resources as a single consolidated unit. A Unit agreement defines how costs and benefits will be allocated among the holders of interest in the unit area.

Unit Area Unit Area means all tracts committed to an approved unit agreement.

Unit Operator Unit operator means the person who stated in writing to BLM that the interest owners of the committed leases have designated it as operator of the unit area.

Utilization Plan Utilization plan means a plan that fully describes the utilization facility (power plant), including measures for environmental protection and mitigation.

Work Over See Formation Stimulation

PERTINENT ENVIRONMENTAL DOCUMENTS

Environmental Documents pertinent to this Order are as follows:

a. Glass Mountain Geothermal Exploration Project, Environmental Assessment/Initial Study, (EA/IS) (Draft) EA # CA027-EA95-06 April 1995 National Environmental Policy Act (NEPA) Lead Agency -BLM, California Environmental Quality Act (CEQA) Lead Agency - Siskiyou County Air Pollution Control District (SCAPCD) *Summary – California Energy General Company submitted a Plan of Operation (POO) for the drilling of up to five temperature core hole (TCH) wells (34-8TCH, 42-13TCH, 11-24TCH, 15-15TCH and 63-20TCH) and the drilling, completion and testing of production size exploration wells (18-32, 46-32, 58-6, 56-18 and 13-18) at five well pads within the Glass Mountain Known Geothermal Resource Area (KGRA). At least two wells were to be drilled at each of the five exploration well pads.*

b. Fourmile Hill Area Geothermal Exploration Project, EA/IS, (Draft) EA # CA027-EA95-11 December 1995 NEPA Lead Agency BLM, CEQA Lead Agency SCAPCD *Summary – Calpine Corporation submitted a POO for geothermal exploration activities consisting of the drilling and testing of two deep geothermal exploration wells and access road construction in the Fourmile Hill Area located in sections 21, 22, 23, 28, 29 and 30 T44N, R3E MDB&M in Siskiyou County*.

c. Glass Mountain Exploration, EA/IS, (Draft) EA # CA320-NEPA02-23 May 2002 NEPA Lead Agency BLM, CEQA Lead Agency SCAPCD *Summary – Calpine Corporation and CPN Telephone Flat, Inc. submitted a POO for the construction of two new well pads (64-27and 85-33), the drilling and completion and flow testing of two deep production size exploration wells (64-27and 85-33) and the drilling of a temperature gradient hole (TGH) on one of these well pads (64-27) The POO also proposed to test three existing exploration wells located within the Unit(68-8, 31-17 and 87-13).*

d. Telephone Flat Geothermal Development Project EIS/EIR, (Draft), SCH #97052078 May 1998, NEPA Lead Agency BLM and U.S. Department of Agriculture, Forest Service (USFS), CEQA Lead Agency SCAPCD *Summary – California Energy General Corporation (CEGC) submitted POOs to the BLM in*

February 1997 to construct and operate a 48 MW geothermal Power plant and wellfield within the Glass Mountain KGRA. The power plant would be fueled by geothermal resources beneath the leases. An approximately 21-mile interconnection transmission line would be constructed to transport the electrical energy to the existing Bonneville Power Administration (BPA) Malin-Warner transmission line. The total estimated area of surface disturbance required for the power plant site, well pads, pipeline corridors, and access toads would be approximately 173 acres. Up to 15 acres per mile of additional surface disturbance would be associated with the proposed transmission line. Surface disturbance for the geothermal fluid production and spent fluid injection activities would be conducted within an approximately 8.41 square mile Participating Area.

e. Telephone Flat Geothermal Development Project EIS/EIR, (Final), SCH #97052078 February 1999, NEPA Lead Agency BLM and USFS, CEQA Lead Agency SCAPCD

f. Update Assessment for the Telephone Flat Geothermal Development Project Final EIS/EIR, California State Clearinghouse Number 97052078, November 2002 Prepared for SCAPCD *Summary – In 1997 applications for approvals to construct and operate the Telephone Flat Geothermal Development Project, (Project) a 48 megawatt (MW) geothermal power plant and wellfield to be built on federal geothermal leases in Siskiyou County, California were filed with BLM. USFS and SCAPCD. These agencies, together with the BPA of the U.S. Department of Energy, prepared and distributed to the public a joint Draft Environmental Impact Statement (EIS)/Draft Environmental Impact Report (EIR) for the Project in May 1998, and a Final EIS/Final EIR in February 1999.*

In May 2000 the BLM and the USFS issued a joint Record of Decision that denied the federal approvals for the project. Subsequently, the SCAPCD took no actions to complete the processing of the Final EIR. The denial of the required federal approvals for the Project was appealed and, and in April 2002, the parties entered into a settlement agreement to stay the litigation and have the BLM and USFS reconsider their earlier decision to deny. The SCAPCD had also been requested to complete its processing of the Final EIR .

The update assessment was prepared to provide the information needed for the state lead agency to determine whether recirculation of the EIR was required prior to certification. It was prepared by contacting the original information sources for the Project EIS/EIR regarding any substantial changes in the Project, the regulatory framework and/or the affected environment which may have occurred for each resource topic since distribution of the Final EIS/EIR; evaluating and identifying any potential substantial project specific or cumulative environmental impacts which could now result, which were not disclosed in the Final EIS/EIR; and identifying and disclosing any new or modified mitigation measures or project alternatives which could substantially reduce the severity of an identified environmental impact.

The Update Assessment found there to be no significant new circumstances or information relevant to environmental concerns and bearing on the Project. Findings of Fact and Statement of Overriding Considerations for the Telephone Flat Geothermal Development Project were issued and the EIR for the Telephone Flat Geothermal Development Project was certified by the SCAPCD on 14 February 2003. A Notice of Issuance for the Authority to Construct for the Project was issued by the SCAPCD on the same day.

BACKGROUND INFORMATION (REGULATORY)

The Medicine Lake Highlands has been a source of interest for possible geothermal development since the mid-1960's. In 1970, the Geothermal Steam Act was adopted and subsequent regulations provided a mechanism for leasing of public lands for exploration, development and utilization of geothermal resources. The U.S. Geological Survey (USGS) recognized the geothermal development potential in the Medicine Lake Highlands and designated 15,371 acres of this area as the Glass Mountain Known Geothermal Resource Area, (KGRA), in 1970. The Glass Mountain KGRA has subsequently been expanded in area and currently encompasses 134,254 acres.

An Environmental Assessment (EA) for the geothermal exploration leasing in the Glass Mountain KGRA was initially prepared by the USFS, in 1981 and a Supplemental EA for geothermal development leasing was prepared by the USFS and BLM in 1984. Geothermal leases in the Glass Mountain KGRA were first issued in the 1980's after competitive lease sales by BLM. The Glass Mountain Unit Lease area encompasses Sections 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36, T44N, R3E; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, and 27, T43N, R3E; Sections 19, 30, 31, 32, 33, 34, 35, T44N, R4E; and Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, and 20, T43N, R4E, MDB&M as shown on Attachment A.

Exploratory geothermal drilling and testing activities in the KGRA began in 1981. Based on the findings of these early exploration activities, the Glass Mountain Federal Geothermal Unit was formed in May 1982. The Unit Agreement provides for a cooperative plan among holders of geothermal leases committed to the Unit to explore and develop the geothermal resources within the Unit. CPN Telephone Flat, Inc. is the current Unit Operator and owns all leases within the KGRA. Past lease holders have included Union Oil Company, Phillips Petroleum, Occidental Petroleum, Anadarko Petroleum and California Energy General Corporation.

The Central Valley Water Board first issued waste discharge requirements for geothermal exploration activities in the Glass Mountain KGRA to Union Oil Company in 1983, (Order No. 83-083). In September 1984 waste discharge requirements Order No. 84-109 was issued to Union Oil Company and USFS for a discharge of drilling waste to clay lined sumps from the drilling of six geothermal wells located in both the Central Valley and North Coast Regions. Both Order No. 83-083 and Order No. 84-109 were for discharges from specific wells. These two Orders were updated in 1988 with the issuance of Order No. 88-095 to Union Oil Company and USFS. Order No. 88-095 did not regulate discharges from the drilling of specific wells and covered the entire geothermal lease area, including both the Central Valley and the North Coast Regions. Waste discharge requirements were again updated in 1991 (Order No. 91-080) to change the name to Unocal Corporation.

In 1995, the Central Valley Water Board adopted Order No. 95-199, to reflect that California Energy General Corporation (CEGC) had acquired the leases from Unocal Corporation. Order No. 95-199 was issued to CEGC, and the USFS, and covered activities in the entire Glass Mountain Geothermal Unit Lease Area, including Fourmile Hill, which is entirely within the North Coast Region, and Telephone Flat, which is within the Central Valley Region. Calpine Corporation purchased California Energy General Corporation in October 2001, and changed the name of the corporation to CPN Telephone Flat, Inc.

On 27 June 2002 the North Coast Water Board adopted waste discharge requirements Order No. R1-2002-0030 for a discharge of geothermal fluid and associated wastes from geothermal exploration operations by Calpine Corporation in the Fourmile Hill area, an area previously covered under waste discharge requirements Order No. 95-199. Order No. R1-2002-0030 named Calpine Corporation, USFS and BLM as Dischargers. Order No. R1-2002-0030 only regulated a portion of the activities occurring in the North Coast Region, as there were still other Calpine activities in the North Coast Region that continued to be regulated by the Central Valley Water Board under Order No. 95-199.

A Memorandum of Agreement, (MOA), among Calpine Corporation, CPN Telephone Flat, Inc., North Coast Water Board, and the Central Valley Water Board, was signed and became effective on 30 August 2002. The MOA states that each regional board shall regulate the geothermal "exploration" activities within their respective regions. However, the Central Valley Water Board shall regulate the entire Glass Mountain Exploratory Project until the North Coast Water Board is able to adopt waste discharge requirements for the parts of the Glass Mountain Exploratory Project that lie within their region.

On 26 September 2002 the North Coast Water Board adopted Order No R-1-2002-0089, which revised Order No. R1-2002-0030 to allow Calpine Corporation to transfer geothermal fluids to geothermal wells within the Central Valley Region for re-injection.

On 28 March 2003, Calpine Corporation and CPN Telephone Flat, Inc., submitted a Report of Waste Discharge requesting a revision of waste discharge requirements, Order No. 95-199. The Report of Waste Discharge and supplemental information submitted by the Discharger presented a list of proposed new wells and temperature gradient holes that may be drilled and/or tested. In addition to the drilling of new geothermal wells and temperature gradient holes, the Discharger proposes to flow test existing wells in the Telephone Flat area. The Discharger proposes in the Report of Waste Discharge to use acid for *"formation stimulation"* in the production zone of exploration wells, Well Nos. 68-8, 31-17 and 87-13. A sundry notice for the injection of hydrochloric/hydrofluoric acid to Well No. 31-17 was issued by BLM and signed by Rebecca Watson, the Assistant Secretary, on 30 April 2003. Formation stimulation is used routinely in the oil and gas industry to increase production, and BLM is confident that it poses a minimal threat to water quality provided that standard protocol is observed. (Formation stimulation through acid injection was actually conducted on Well No. 31-17 by Unocal in 1989.) Nevertheless BLM

determined that the pertinent environmental documents have failed to adequately address formation stimulation. The BLM has stated that no well other than No. 31-17 may be treated until additional NEPA and CEQA review have been completed. The Central Valley Water Board concurs with BLM's decision, and initially prohibits the use of formation stimulation on any well except No. 31-17 in this Order. At such time as NEPA and CEQA review of formation stimulation have been completed, this Order will be reopened, if necessary, to include additional wells and conditions to address any additional mitigation measures relevant to water quality.

In May 2003 the leases owned by Calpine Corporation were moved to their wholly owned subsidiary, Calpine Siskiyou Geothermal Partners, L.P. Calpine Siskiyou Geothermal Partners L.P. was formed on 26 August 1994. The limited partners are Modoc Power Inc. (44.34%) and Mt. Hoffman Geothermal Company, L.P. (55.66%).

It had been intended to place the revised waste discharge requirements on the agenda for the April 2004 Board Meeting, however it became apparent prior to the meeting that the geothermal well tests planned for the summer of 2005 would not take place, and it was decided to postpone adoption. Calpine Corporation submitted a letter to the Central Valley Water Board dated 10 January 2006 stating that construction was planned for the Telephone Flat Development Project in 2006, and requesting that tentative waste discharge requirements be placed on the Central Valley Water Board agenda as soon as possible.

BACKGROUND INFORMATION (TECHNICAL)

To extract geothermal energy for electrical power generation the resource must meet certain conditions. The trapped heated water, present in the faults, fractures and pores of the high temperature rock, should ideally be in excess of 300° F and not excessively deep, i.e. no more than 10,000 feet below ground surface. To locate and evaluate such resources it is necessary to implement an exploration program. For power plant design purposes it is necessary to characterize the enthalpy properties of the hot water/steam mix as it exits at the well head. Enthalpy is a thermodynamic property that can most easily be thought of in the context of geothermal power generation as "energy content." The purpose of the exploration process is to locate and identify wells that are capable of delivering geothermal fluids of sufficiently high enthalpy to be suitable for the generation of electrical power. The geothermal fluids will be transported via surface pipelines from the wells to a dual-flash geothermal power plant, where steam will be directed to a steam turbine-driven generator. The turbine exhaust steam will be condensed and pumped to a cooling tower. Spent brine and condensate (geothermal fluid) will initially be pumped through surface pipelines to injection wells for injection back to the subsurface geothermal reservoir.

A typical Glass Mountain geothermal well has the following specifications:

Casing Size	9.625 In.
Casing Depth	4000 Ft.
Slotted Liner Size	7 In.
Slotted Liner Depth	9,000 Ft.
Open Hole Size	8.5 In.
Bore Hole Temp.	475º F

PROPOSED GEOTHERMAL OPERATIONS

The Report of Waste Discharge and supplemental information submitted by the Discharger presented a list of proposed new wells and temperature gradient holes that may be drilled and/or tested. All of these new wells and temperature gradient holes have been referenced in environmental documents. The listing is as follows:

Temperature Gradient Hole Nos. 34-8, 42-13, 11-24, 15-15, and 63-20.
Geothermal Well Nos. 18-32, 46-32, 56-18, 58-6 and 13-18. The location of these wells is shown on Attachment B, a part of this Order by reference. *(Glass Mountain Unit Geothermal Exploration Project, Environmental Assessment/Initial Study, EA#CA027-EA95-06, April 1995).* The Government will not authorize Well Nos. 18-32 and 46-32, both of which are in the USFS Mt. Hoffman Inventoried Roadless Area until a NEPA review is completed. The original EA did not discuss or disclose the potential effects of the loss of roadless characteristics due to constructing and utilizing these wells and associated facilities.

Geothermal Well Nos. 26-7, 84-7, 46-8 (existing pad with no well), 64-8, 68-8 (existing well on pad with sump), 73-13, 87-13 (existing well on pad with sump), 15-16, 26-17, 31-17 (existing well on pad with sump), 72-17, 13-18, 16-18, 25-18, 51-18, 52-18, 56-18 and 83-18. The location of these wells is shown on Attachment C a part of this Order by reference. *(Telephone Flat Geothermal Development Project EIS/EIR, February 1999, and Update Assessment for the Telephone Flat Geothermal Development Project EIS/EIR, November 2002)*

In addition to the drilling of new geothermal wells and temperature gradient holes, the Discharger proposes to flow test existing Wells Nos. 68-8, 31-17 and 87-13 in the Telephone Flat area as shown on Attachment D a part of this Order by reference. The Discharger proposes to re-inject these geothermal fluids to existing wells within the KGRA provided that such activity has been approved by BLM and U. S. Environmental Protection Agency (USEPA) for that purpose. *(Glass Mountain Exploration, Environmental Assessment/Initial Study, CPN Telephone Flat, Inc., May 2002)*

The three existing wells to be flow tested have not been pumped since 1989-91, over 15 years ago. Chemical analysis of fluid from the three wells is presented in the table below:

Parameter	Well No. 68-8 (11/02/89) (mg/L)	Well No. 31-17 (11/06/89) (mg/L)	Well No. 87-13, (12/11/89) (mg/L)
Antimony	0.52	<0.49	< 0.2
Arsenic	5.87	5.47	1.9
Beryllium	-	-	<0.02
Boron	14.95	13.83	10
Cadmium	<0.05	<0.05	<0.02
Calcium	184.22	16.60	6.5
Chromium, Total	<0.12	<0.12	<0.05
Cobalt	< 0.2	< 0.2	<0.02
Iron	0.21	0.07	0.2
Lead	<0.24	<0.24	<0.2
Magnesium	0.21	0.24	<0.5
Manganese	<0.24	<0.24	<0.2
Mercury	-	-	0.0006 (600 ng/L)
Molybdenum	<0.61	<0.61	<0.1
Nickel	<0.12	<0.12	0.04
Potassium	184.22	165.19	78
Selenium	-	-	<0.005
Sodium	1,087.17	995.52	560
Thallium	<2.44	<2.44	<0.3
Vanadium	<1.22	<1.22	<0.5
Zinc	-	-	<0.02
Bicarbonate ($HCO_{3)}$	14.00	27.00	-
Chloride (Cl)	1910	1690	-
Fluoride (F)	5.90	3.10	-
Sulfate (SO_4)	43.0	42.0	-
Total Dissolved Solids	4,000	3,600	-
Electrical Conductivity (µS/cm)	-	5,400	-
pH	7.07	-	-

The analytical data presented above, suggests that the geothermal fluid may be high in arsenic and may contain mercury. Mercury has not been analyzed for Well Nos. 68-8 and 31-17. In the analysis for Well No. 87-13 the Discharger analyzed for mercury using an inductively coupled plasma-mass spectrometry, (ICP/MS) method. The Discharger will now be required to use the ultra clean sampling protocol and analysis by cold vapor atomic absorption (CVAA) (USEPA

Method 1631) for all future mercury monitoring including ground and surface water monitoring as well as geothermal fluid monitoring.

Wastes produced during drilling operations include soil, drill (rock) cuttings, drilling muds with additives, oil and associated wastewater. Drilling mud is inert mineral clay such as bentonite clay. Drilling mud additives may include sodium bicarbonate, soda ash, drilling soap, organic polymers, wood fibers, graphite, cottonseed hulls, walnut shells and cement. Drilling mud additives do not render the drilling mud hazardous when used according to manufacturer's specifications. During drilling operations, drilling mud, aerated mud and/or air will be used to transport drill cuttings to the surface. Drilling mud will be treated and contained in a closed system for continuous circulation using metal tanks. Drilling mud may be re-used in the drilling of additional wells, provided it is stored in impervious tanks. At the conclusion of drilling, drilling muds may be mechanically de-watered and discharged to a lined cuttings sump or transported offsite for disposal at a regulated drilling mud disposal facility. Liquid from the de-watering will be discharged to a geothermal fluids sump. Auxiliary tanks will be used to collect any extraneous rig runoff and wash water used for separating solid drill cuttings.

a. Temperature Gradient Holes: Drill cutting solids from temperature gradient holes will be mechanically separated, and deposited in un-lined "temperature gradient hole cutting sumps" (approximately 5,000 to 25,000 gallon capacity) located adjacent to drilling pads. Excess cement slurry from temperature gradient holes will also be discharged to the temperature gradient hole cuttings sumps. A representative composite sample of drill cuttings will be taken at the completion of drilling. If sample analysis confirms that the cuttings are non hazardous and non designated wastes, the sump may remain open for future use. Wastes confirmed "designated" as defined in Section 13173 of the California Water (CWC), or "hazardous" as defined in Article 1, Chapter 11, Division 4.5 of Title 22 California Code of Regulations (CCR), shall be removed and transported to an appropriate disposal site within 30 days after completion of test. Any temperature gradient hole cuttings subsequently discharged to the sump must be sampled as for the initial discharge. When the cutting sumps have been filled to within two feet of the top, the Discharger may backfill with clean native soil, provided that all analysis have confirmed the contents of the sump to be neither hazardous nor designated.

b. Geothermal Wells: Drill cutting solids from geothermal wells will be mechanically separated, and deposited in lined "geothermal well cutting sumps" (approximately 187,000 gallon capacity) located adjacent to drilling pads. These cutting sumps will be constructed with a certified minimum two-foot thick clay liner, or equivalent synthetic liner, and tested to ensure a permeability of less than $1x10^{-6}$ centimeters per second (cm/sec). Excess cement slurry from the wells will also be discharged to the cuttings sumps. A representative composite sample of drill cuttings will be taken at the completion of drilling. If sample analysis confirms that the cuttings are non

hazardous and non designated wastes, the sump may remain open for future use. Wastes confirmed, "designated" as defined in CWC Section 13173., or "hazardous" as defined in Article 1, Chapter 11, Division 4.5 of Title 22 CCR, shall be removed and transported to an appropriate disposal site within 30 days after completion of test. Any well cuttings subsequently discharged to the sump must be sampled as for the initial discharge. When the cutting sumps have been filled to within two feet of the top, the Discharger may backfill with clean native soil, provided that all analysis have confirmed the contents of the sump to be neither hazardous nor designated.

Bore cleanout and flow tests will be performed at completion of drilling to remove drill cuttings and mud and evaluate the well for geothermal production. The liquid phase geothermal fluid from the test will be discharged to either a new or existing "geothermal fluid sumps" having a liner with a minimum two-foot thickness of compacted clay with a permeability of less than $1x10^{-6}$ cm/sec. The rate of discharge will be approximately 500-600 gallons per minute. The sumps have a volume of approximately 750,000 gallons and an area of approximately 10,000 square feet. Since some of the existing sumps have not been used for over ten years and may have gone through a number of freeze-thaw and hydration cycles, the Discharger will be required to re-compact the liners to ensure a permeability of less than $1x10^{-6}$ cm/sec. The re-compacted liners will be required to be permeability tested under the supervision of a licensed professional Civil Engineer registered in the State of California. Alternatively, an equivalent synthetic liner meeting the permeability specifications and approved by the Executive Officer could be used.

Re-injection to a geothermal well will take place concurrently with the well test, and will be to a well approved for this purpose by BLM and USEPA. At the completion of each well test, any remaining fluids in the discharge sump will be re-injected within 60 days or in no case later than **1 November** in any calendar year The lines from the sumps to the re-injection wells will be approximately six inch diameter steel with grooved clamped joints tested at twice the operating pressure.
Residual fluids and/or accumulated solids in the sumps will be sampled and analyzed to confirm that they are nonhazardous. If residual material is nonhazardous, the sumps will be left open until it is determined that there will be no further testing or the sumps are full. At this time the sumps will be back-filled and capped with a soil layer capable of supporting vegetative growth. The USFS has requested that one or more of the geothermal fluid sumps be left unfilled after closure in order that they may fill with rainwater and snowmelt and provide wildlife habitat

The actual number and location of production and injection well sites to be used during the Telephone Flat Development Project will depend on the results of drilling, testing, and the response of the geothermal reservoir. The expected startup production well sites would be: 16-18, 13-18, 52-18 (or 51-18), and 56-18; and the expected startup injection well sites are:
68-8 (existing), 72-17, and 15-16. Well sites 46-8 (existing well pad with no well), 84-7 and 31-17 (existing) could be either production or injection will sites depending on project needs. The

other identified well pad locations including: 26-7, 64-8, 73-17, 16-18, 25-18 and 83-18 would be used if supplemental production or injection is required as "make-up" over the life of the project.

The proposed exploration and development would include construction of two new well pads, for drilling, completion and flow testing of two deep production size wells, 85-33 and 64-27. These two sites are immediately south and east of Fourmile Hill and are in the North Coast Region. The wells will be drilled to a depth of approximately 9,000 feet and flow tested for up to 30 days. Prior to drilling the well at 64-27 the Discharger plans to drill a temperature gradient hole to 6,000 feet or 500° F whichever comes first. Additionally a temperature gradient hole cuttings sump and geothermal fluid sump would be constructed.

As stated earlier, exploration activities in the Fourmile Hill Area are covered under waste discharge requirements Order No. R1-2002-0030 adopted by the North Coast Water Board on 27 June 2002 and revised on 26 September 2002 by Order No. R1-2002-0089. The Discharger is prohibited from injecting acid at wells 85-33 and 64-27, and is also prohibited from injecting geothermal fluid to these wells from other wells, which have recently been acidified. The Discharger proposes to re-inject geothermal fluid from flow tests in the Fourmile Hill Area to approved well(s) in the Telephone Flat area. The geothermal fluids to be re-injected will initially be conveyed in four to six inch diameter steel pipe with grooved clamed joints. The approximate pipeline routes are shown in Attachments A and D. The Discharger is required to develop and implement a leak detection program, which shall include inspection of the pipelines at least once per day.

Numerous geothermal reservoirs contain zones of low permeability, which limit the development potential and the efficient recovery of heat from these reservoirs. The cause of the low permeability may be the natural condition of the reservoir or formation damage incurred during drilling. The Discharger intends to use acid for *"formation stimulation"* in the production zone of Well Nos. 68-8, 31-17 and 87-13 or any new well in the Telephone Flat project area. Formation stimulation is covered in the, *Update Assessment for the Telephone Flat Geothermal Development Project EIS/EIR, November 2002*, which states that BLM would review any proposal for formation stimulation by well acid operations or injection under a *"sundry notice"* pursuant to 43 CFR 3261.22 and would adopt stipulations as necessary. Formation stimulation consists of injecting hydrochloric and or hydrofluoric acids into the production formation of each well. The chemical action of the acids on the adjacent strata may open up the formation and increase the production rate of geothermal fluids. The acid dissolves the calcium carbonate and silica-based minerals which may have been deposited or precipitated in the natural geothermal reservoir fractures and which reduce or prevent the flow of geothermal fluid from the reservoir through fractures into the well bore. After allowing the acid sufficient time to dissolve the precipitated minerals in the geothermal reservoir, the spent acid is flowed back to the surface and discharged first to the adjacent geothermal fluid sump before being injected immediately back into the geothermal reservoir. Immediate re-injection is required since the spent acid waste may contain high concentrations of dissolved minerals and metals. To insure re-injection remains

uninterrupted, the Discharger will maintain two re-injection pumps, one primary and one spare, at each fluid sump being used for formation stimulation. Spare pumps will be tested on a regular basis to insure they are in operating condition. Before acid injection can be performed, Provision D.9. of this Order requires the Discharger to: (1) submit a report prepared by a registered geologist or engineering geologist making recommendations for the placement of monitoring wells and providing a rationale for the placement and (2) install the wells recommended in the report.

Water for use in both the Telephone Flat and Fourmile Hill exploration programs will be supplied from the CPN Telephone Flat Inc., supply well or the USFS wells which are adjacent to geothermal Well No. 17A-6 in the Arnica Sink area, in Section 1, T43N, R3E and Section 6, T43N, R4E respectively.

SITE DESCRIPTION, SURFACE AND GROUNDWATER CONSIDERATIONS

The project is within an area identified as the Medicine Lake Highlands, which is approximately 30 miles northeast of Mt. Shasta. The Medicine Lake Highlands is composed primarily of volcanic formations, including cinder cones, caldera basins, craters, lava flows and domes, and a basalt capped plateau. Medicine Lake Valcano is a shield volcano covering a 750 square mile area with approximately 140 cubic miles of surficial volcanic rocks. The Medicine Lake Highlands have undergone very recent volcanic activity including the eruption of basalt flows, obsidian flows and domes, and pyroclastic pumice. The more recent basalt flows are thought to be as young as 500 years. Erupted materials that now form the rocks and soils in the vicinity of the project include: andesite, dacite, rhyolite, basalt, cinders, pumice, obsidian, and ash. The project is not situated in an area of high seismic activity; however, there are numerous active and inactive faults in the region. The Likely Fault and the Surprise Valley Fault, located 50 miles and 75 miles respectively from the project area, have the potential to produce a seismic event of magnitude 5.0 or greater.

The Medicine Lake Highlands area is notable for its lack of permanent surface water drainages. The surface materials in the project area are very permeable, causing water to infiltrate the surface. Soils in the project area are described as well drained to excessively well drained sandy loams formed in materials weathered from extrusive igneous rocks overlain by young pumice and ash deposits. Medicine Lake Highlands stands above the general landscape and is generally perceived as a water source for streams, regional aquifers, springs, and wells. Two hydrologic units have been identified within the Medicine Lake Highlands, the shallow groundwater system that occurs only within the highlands, and the geothermal reservoir. The shallow system is a perched system that occurs at an elevation of approximately 3,300 feet higher than the regional groundwater systems of the Modoc Plateau. The water source for the shallow system is infiltration of precipitation, primarily snowmelt. The shallow groundwater is separated from the geothermal reservoir by a thick sequence of non-porous highly altered volcanic rocks, which form a thick

impermeable cap. Shallow groundwater elevations are highest in the center of Medicine Lake Highlands with flow moving radially away from the center.

The groundwater table on the flanks of the Medicine Lake caldera is described as erratic, varying from about 300 ft to over 1000 ft below ground surface. Within the caldera of the Medicine Lake Highlands, the depth to the first major aquifer is generally about 200 ft. The groundwater hydrology of Medicine Lake Highlands is controlled by a number of factors including:

a. Thick and highly permeable surficial deposits of lava flows, cinders, and pumice that readily allow infiltration of precipitation.
b. A saturated thickness (groundwater interval) that generally ranges from a few hundred feet to about 2000 feet.
c. An impermeable, high temperature gradient zone that underlies the groundwater saturated zone and forms a thick (1500 feet to several thousand feet) obstruction to flow between the groundwater aquifer and the geothermal system.
d. Radial outflow of groundwater away from the caldera rim of the Medicine Lake Highland (i.e. down the regional hydrologic gradient).

As a result of (c.) above and the casing design imposed by BLM, the impacts to groundwater will be insignificant, provided the Discharger complies with the requirements of BLM and USEPA and the requirements, provisions, and mitigations measures prescribed in this Order and Monitoring and Reporting Program No. _____.

Medicine Lake is the largest body of water in the basin and represents the lowest elevation within the volcanic basin. Other surface water bodies within the basin include, Little Medicine Lake, Blanche Lake, and Bullseye Lake. There is also a large dry lakebed, Arnica Sink, located 1.5 miles east of Medicine Lake. Surface drainage in the Telephone Flat area and the sections outside that area covered in these waste discharge requirements, is tributary to either Medicine Lake or Arnica Sink. A number of springs and intermittent streams exist including Paynes Spring I, Paynes Spring II, Paynes Spring III, Crystal Spring, Schonchin Spring, and an unnamed spring. The Paynes Springs are the source of Paynes Creek, a perennial creek approximately two miles long. A perennial stream associated with Crystal Springs flows into Medicine Lake. Other streams in the project area are intermittent, only flowing after snowmelt and intense storm runoff. The almost total absence of perennial stream flow in the Medicine Lake Highlands results from the combination of relatively low precipitation (largely snowfall in the winter) and highly permeable volcanic soils and lava flows. Annual precipitation for the Medicine Lake area is estimated to be 35 to 45 inches, with an average of approximately 43 inches.

APPLICABLE REGULATIONS, POLICIES AND PLANS

The Central Valley Water Board adopted a Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins (hereafter Basin Plan). The Basin Plan designates

beneficial uses, establishes water quality objectives, and describes an implementation program and policies to achieve water quality objectives for all waters of the Basin.

Medicine Lake Crater is a Hydrologic Subarea of the Pit River Hydrologic Unit, which is part of the Central Valley Basin. Beneficial uses of surface waters in the Medicine Lake Basin are not specifically listed in the Basin Plan and there are no direct surface tributary streams to the Pit River. The USFS and BLM have listed the uses of surface waters within the Medicine Lake Highlands as follows:

Surface Water Feature	Surface Water Uses
Medicine Lake	Domestic Use, Recreation, Fish Habitat
Little Medicine Lake	Recreation, Fish Habitat
Bullseye Lake	Recreation, Fish Habitat
Blanche Lake	Recreation
Paynes Spring I	Paynes Creek, Recreation, Fish Habitat
Paynes Spring II	Paynes Creek, Recreation, Fish Habitat
Paynes Spring III	Seep Only—No Identified Use
Schonchin Spring	Domestic Use
Crystal Spring	Crystal Spring Creek, Domestic Use, Recreation, Fish Habitat

The beneficial uses of the underlying groundwater are municipal and domestic supply, agricultural supply, and industrial supply. Fresh water for use within the project area, primarily dust suppression and drilling activities, will be either trucked in or supplied from an existing water supply well within the Arnica Sink area. Fresh water may be pumped from the supply wells to other sites within the project area.

State Water Resources Control Board (State Water Board) Resolution No. 88-63, a policy entitled "Sources of Drinking Water," adopted May 19, 1988, provides that all surface and groundwaters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Water Boards, with certain exceptions. Among other exceptions, State Water Board Resolution No. 88-63 provides for exceptions where the aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Section 261.3.

The Safe Drinking Water Act, (SDWA), authorizes USEPA to regulate "underground injection" which Section 1421 (d) (1) defines as the "subsurface emplacement of fluids by well injection." The regulation of all injection wells is covered in Part 144 CFR under the underground injection control (UIC) program. The regulations in this part establish minimum requirements for the UIC Programs. Each state must meet these requirements in order to obtain primary enforcement

authority for the UIC Program in that state. Class V injection wells in California are administered by USEPA, however in the special case of geothermal injection wells the California Division of Oil, Gas and Geothermal Resources assumes responsibility under a Memorandum of Agreement with USEPA. Geothermal production wells are also regulated by the California Division of Oil, Gas and Geothermal Resources, except for projects on federal lands in which case BLM assumes responsibility under a Memorandum of Understanding with the California Division of Oil, Gas and Geothermal Resources.

Re-injection from the well head to the geothermal aquifer, including but not limited to approval of wells for re-injection, well location, casing design, flow rate and volume of geothermal fluids injected, casing leak detection, additives, leak detection and inspection is regulated by BLM and USEPA. The Regional Water Boards regulate, through waste discharge requirements, the transfer of geothermal fluid from well head to well head, storage of geothermal fluid prior to re-injection, the monitoring of water quality in groundwater aquifers.

CEQA AND LEGAL CONSIDERATIONS

In 1996, Calpine Corporation submitted a Plan of Operation (POO) to the BLM for construction and operation of a 49.9 megawatt (MW) geothermal power plant in the Fourmile Hill area in the North Coast Region. A Draft EIS/EIR for the project was distributed to the public for review and comment in July 1997. In February 1997 CEGC submitted a Plan of Operation to the BLM for construction and operation of a 48 MW geothermal power plant in the Telephone Flat area in the Central Valley Region. In May 1998 a Draft EIS/EIR for the project was distributed to the public for review and comment. On 31 May 2000 separate Records of Decision (RODs) were issued by the USFS and BLM for the two power plant projects described above. The Fourmile Hill Plan of Operation was approved as amended. The Telephone Flat Plan of Operation was denied on the basis of its effect on American Indian use of Medicine Lake and on American Indians as a minority population. CEGC did not present the EIR to the CEQA lead agency, Siskiyou County Air Pollution Control District, (SCAPCD), for approval. However, in a letter dated 17 April 2002, Calpine Corporation, the new owner of CECG, requested the SCAPCD to certify the EIR.

On 4 April 2002, the United States Department of Justice and CPN Telephone Flat Inc. reached an agreement to resolve breach of contract and litigation concerning the denial of the Telephone Flat Geothermal Development Project. As part of the settlement agreement, the BLM and USFS were to reconsider the May 2000 ROD, which denied the project. In turn CPN Telephone Flat Inc., agreed to suspend litigation against the United States until the reconsideration was complete. The reconsideration took into account the President's National Energy Policy and other changes in the renewable energy field, which had occurred since the May 2000 decision. The settlement directed both BLM and USFS to complete reconsideration by November 2002.

On 26 November 2002 the BLM and USFS approved development of the 48 MW geothermal power plant at Telephone Flat by CPN Telephone Flat Inc. BLM and USFS determined that the

environmental analysis conducted under provisions of the NEPA was still valid, but that the increased national and state focus on renewable energy, along with the further mitigation measures required, including realignment of the power line to reduce visual and environmental impacts, justified approval of the project. A determination of NEPA adequacy and a Biological Opinion (no jeopardy) accompanied the decision.

An Update Assessment to the *Telephone Flat Geothermal Development Project EIS/EIR, February 1999,* was prepared for the SCAPCD, in November 2002 to provide information to determine if recirculation of the EIR would be required prior to certification. The Update Assessment found there to be no new circumstances or information relevant to environmental concerns and bearing on the project. Further the Update Assessment found no additional feasible mitigation measures, that are considerably different from others previously analyzed in the final EIR/EIS, which would clearly lessen or reduce the previously identified environmental impacts to a level of insignificance and which were declined to be adopted by the project sponsor. The SCAPCD by and through the Air Pollution Control Officer (APCO) concluded in its Findings of Fact and Statement of Overriding Considerations that the economic, social, and other benefits of the project would override any significant environmental impacts. The APCO certified the Telephone Flat Geothermal Development Project EIR (State Clearinghouse No. 97052078) on 14 February 2003. An administrative appeal of the APCO's decision to certify the EIR was denied by the SCAPCD by and through its Board of Directors on 25 March 2003, at which time the SCAPCD Board took the following actions affirming the APCO's conclusions:

- Certification of an EIR for the Telephone Flat Geothermal Development Project (State Clearinghouse No. 97052078); and
- Adoption of a Mitigation Monitoring and Reporting Program (Statement of Decision 03-01); and
- Adoption of Findings of Fact and Statement of Overriding Considerations for the Telephone Flat Geothermal Development Project (Statement of Decision No. 03-01); and
- Adoption of the Second EIR Errata (Statement of Decision 03-01).

Two additional EA/ISs for geothermal exploration projects were prepared for the Siskiyou County Air Pollution Control District, (SCAPCD); "Glass Mountain Unit Geothermal Exploration Project", (EA# CA027-EA95-06), April 1995, and "Glass Mountain Exploration", (EA# CA320-NEPA02-23), May 2002.

FINANCIAL ASSURANCE

BLM has required the Discharger to post financial assurance for closure, including the following activities: Plug and abandon 18 geothermal wells, reclaim 18 wellpads, reclaim the sumps on each of the 18 wellpads, remove 1.8 miles of water lines from Arnica Sink, remove 7.9 miles of production and injection pipelines, plug 3 water monitoring wells, abandon 11.5 miles of roads

within wellfield, reclaim powerplant pad site, tear down and remove powerplant, cooling tower, ancillary buildings, and foundations within plant site and tear down and remove 23 miles of 230 KV transmission line. If these financial assurance funds become encumbered for some purpose other than site closure, or become unavailable for site closure for any reason, the Discharger shall immediately notify the Central Valley Water Board, and the Discharger shall, **within 30 days of such notification and by 30 April of each year thereafter**, prepare and submit, plans with detailed cost estimates and a demonstration of assurances of financial responsibility to ensure closure and post-closure maintenance of sumps, wells and temperature gradient holes. The assurances of financial responsibility shall provide that funds for corrective action shall be available to the Central Valley Water Board upon the issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction or operation.

In addition, the Discharger shall prepare and submit plans with detailed cost estimates and a demonstration of assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases arising from the exploration and/or development of geothermal resources within the Telephone Flat project area or those areas of the Fourmile Hill project area under the jurisdiction of the Central Valley Water Board. The financial assurance fund for such corrective action shall be established **prior to any of the following actions (but no later than 30 April 2007):** the discharge of geothermal fluid, cuttings from geothermal wells or temperature gradient holes to sumps, or the performance of formation stimulation. The Discharger proposes to issue the financial assurance in the form of a Certificate of Deposit (CD) in the name of the State Water Board. The amount of the CD will be based on the sum of costs arising from two "worst case scenarios" as follows: 1. Calpine is in the process of testing a well and has filled a geothermal fluids sump with geothermal fluid. At this point they abandon the project and a contractor must be hired to come to the site and pump the geothermal fluid in the sump to an injection well. 2. A leak develops in a geothermal fluids sump liner and must be repaired immediately.

BASIS FOR PERMIT CONDITIONS

This Order regulates discharges associated with the drilling and testing of geothermal wells including land clearing, well pad construction, sump construction, fluids discharged to sumps, geothermal fluid transfer, and the fluids from chemical addition of acid to the wells. These activities are referenced in the environmental documents referred to in Finding No. 5 and listed under "Pertinent Environmental Documents" in this Information Sheet. Well locations associated with these environmental documents are shown on Attachments B, C, and D. "Exploration" in these waste discharge requirements means land clearing, well drilling, well pad construction, sump construction, well testing, installation of sumps, geothermal fluid transfer, re-injection of geothermal fluid, temporary storage of petroleum fuels and other activities that are referenced in

environmental documents entitled "Exploration Project" or "Exploration." "Development" in these waste discharge requirements means all the elements of Exploration as well as formation stimulation, which are referenced in environmental documents entitled "Telephone Flat Geothermal Development Project." Plant construction and operation, activities associated with transmission line construction and construction of sanitary waste disposal facilities are also part of "Development," but are not covered in these waste discharge requirements.

The discharge of drilling mud and cuttings from well drilling operations to an on-site sump is exempt from the requirements of Title 27, of the CCR, as set forth in Section 21565 in Title 27. The exemption, pursuant to Section 20090(g), applies to operations where:

a. Discharges are to on-site sumps and do not contain halogenated solvents, and

b. The Discharger removes all wastes from the sump, or

c. The Discharger removes all free liquid from the sump and covers residual solid and semi-solid wastes, provided that representative sampling of the sump contents after liquid removal shows residual solid wastes to be nonhazardous. If the sump has appropriate containment features, it may be reused.

At the conclusion of drilling, drilling muds will be transported offsite to a regulated drilling mud disposal facility.

Prohibitions:

The discharge of geothermal injection fluids, drilling mud, spent acids used for permeability enhancement, drill cuttings, petroleum products, or other waste streams associated with exploration and development of geothermal resources in a manner contrary to that described in Finding Nos. 6, 7, 10, 11, 12 and 15, or to surface waters, or surface water drainage courses is prohibited.

Discharge Specifications and Provisions:

The requirements cover the design, construction, and operation of the sumps (temperature gradient hole cuttings sumps, geothermal well cuttings sumps and geothermal fluid sumps) including specifications for closure at the completion of the exploration activities. All petroleum products, acids, hydraulic fluids, drilling mud additives or other liquid materials shall be stored and used in such a manner that all spills are contained. The Discharger will be required to submit a storage statement and obtain coverage under the Aboveground Petroleum Storage Tank Act (APST Act). The APST Act requires preparation of a Spill Prevention Control and Countermeasure (SPCC) Plan. These waste discharge requirements require the Discharger to include all hazardous materials including acids and other materials in the SPCC Plan.

The Discharger is required to develop and implement a plan for immediate detection of leaks or

failures in the pipelines carrying hot pressurized geothermal fluid for re-injection. The Discharger is also required to install at least three shallow monitoring wells and one deep monitoring well as referenced in the "Medicine Lake Basin Comprehensive Hydrology Monitoring Plan."

Antidegradation Considerations:

The conditional discharge as permitted herein is consistent with the provisions of the State Water Board Resolution No. 68-16. Geothermal wells are cased to prevent loss of geothermal fluids. The Discharger is required to document that new and existing geothermal fluid sumps as originally constructed have a compacted clay liner of minimum two-foot thickness and a minimum permeability of $1x10^{-6}$ cm/sec. Because the sumps in the Telephone Flat area have not been used for over 10 years and may have developed cracks due to periods in which the liners were desiccated, the Discharger will be required to re-compact these liners and retest the them to confirm that the permeability requirement is being met. Tests for all sump liners will be conducted under the supervision of a licensed Professional Civil Engineer or Certified Engineering Geologist, registered in the State of California. The flow testing of geothermal wells will proceed for approximately 30 days and the Discharger is required to empty the sumps of geothermal fluids within 60 days of testing. This means that geothermal fluid will be in the sumps for a maximum of 90 days, minimizing the opportunity for percolation of geothermal fluids to groundwater. Following formation stimulation, immediate re-injection of spent acid is required since the spent acid waste may contain high concentrations of dissolved metals. To insure re-injection remains uninterrupted, the Discharger will maintain two re-injection pumps, one primary and one spare, at each fluid sump being used for formation stimulation. Spare pumps will be tested on a regular basis to insure they are in operating condition.

The extent of degradation allowed by this Order will not unreasonably affect present and anticipated beneficial use of such water or result in water quality less than that described in the Basin Plan.

MONITORING AND REPORTING PROGRAM AND COMPREHENSIVE HYDROLOGY MONITOIRNG PLAN

The Monitoring and Reporting Program for this Order includes requirements for notification prior to construction activities and certification that construction of the sumps complies with the specifications in Order No._____. The Monitoring and Reporting Program also includes monitoring for geothermal fluids discharged to the sumps and waste remaining in the sumps prior to closure or removal, surface and groundwater quality and the aboveground pipeline. Measurements of fluid level in the geothermal fluids sumps is required for both leak detection and demonstration of adequate freeboard. The Discharger is required to leak test any sump within twelve months of discharging geothermal fluid to that sump. Details of leak test monitoring are presented in the monitoring and reporting program.

The updated Medicine Lake Basin Comprehensive Hydrology Monitoring Plan submitted by the Discharger appears in Attachment E of these WDRs and is incorporated as part of Monitoring and Reporting Program No. ___. The Medicine Lake Basin Comprehensive Hydrology Monitoring Plan is perceived by BLM and the USFS as a dynamic document that will change as project requirements change. The updated version of the Comprehensive Hydrology Monitoring Plan has been reviewed by the Central Valley Water Board, BLM and the Telephone Flat Development Project Oversight Committee. The Discharger proposes a combination of groundwater monitoring adjacent to each development project site and area wide baseline data collection/water quality monitoring. The Discharger proposes a monitoring frequency of twice annually, unless otherwise specified in the individual project WDRs. Prior to start-up of the either the Telephone Flat Development Project or the Fourmile Hill Development Project, Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc. will complete installation of a minimum of three shallow groundwater monitoring wells and one deep groundwater monitoring well at the respective project site. In addition to these project specific monitoring wells, several domestic water wells, natural springs and lakes within the Basin will also be monitored. The surface springs, lakes, and domestic wells that will be monitored were identified in USGS Open-File Report 95-750. The EIR/EIS does not require the mitigation measures for the Telephone Flat Development Project to take effect until the development project begins; however, CPN Telephone Flat, Inc., has voluntarily begun monitoring many of the sites in the Monitoring Plan. CPN Telephone Flat, Inc., has submitted a report presenting data gathered on the water quality of lakes and wells sampled twice during 2002.

Surface and groundwater monitoring in the Monitoring and Reporting Program incorporates the revised Comprehensive Hydrology Monitoring Plan submitted by the Discharger (Attachment E). Additional sampling is required for the three shallow groundwater monitoring wells for the first year.

JFR: sae